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ABSTRACT

The effect of verbal and visual (color or black/white) coding strategies in self-paced instruction and test materials in facilitating student retention on different cognitive tasks was studied. The 176 college student subjects received instruction and testing using varied combinations of color or black/white materials. Instructional materials were a self-paced learning booklet with simple line drawings, word labels, and prose text on the human heart. Self-paced test materials measured four cognitive knowledge tasks. Color-coded, self-paced presentation materials were superior to black/white presentation materials on both immediate and delayed posttests; however, color presence in evaluation materials did not affect achievement. The effectiveness of color-coded instructional materials may result from the sustained student attention and content interaction they demand and the enhanced associative memory structure they provide. Color-coding had a more positive impact on visual than on verbal task tests. Recall decline from immediate to delayed retention testing was similar for both color-coding and black/white instructional groups. (LMM)

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THE INSTRUCTIONAL EFFECT OF COLOR IN IMMEDIATE AND DELAYED RETENTION

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Problem

The purpose of the study was to assess the relative achievement effect of verbal and visual color or black/white coding strategy, when incorporated into self-paced instruction and test materials for facilitating student retention on different cognitive tasks.

Perspective

Research during the instructional media era of the 1950's and 1960's was comparative in nature and sought to identify device usefulness rather than to identify the parameters impacting on elements of the message. In surveying the color literature, researchers have concluded that the significance of color as a message design variable has typically eluded researchers who have attempted to define its unique role rather than its possible interrelated role in the acquisition and retrieval process. While there is support for the affective preference for color and for the physiological and developmental influence of color, it is evident that the cognitive value of color to the learning process must be clarified further.

Design

Independent variables were type of presentation coding employed (color or black/white), type of evaluation coding employed (color or black/white), students' retention performance (immediate and six-week delayed), and type of criterion task represented by the testing material (drawing, identification, terminology, and comprehension test). The dependent variable was the number of correct responses on each twenty-item criterion test.

Methods

One hundred seventy-six college students were randomly assigned to one of four treatment conditions: (1) color presentation with color evaluation materials; (2) color presentation with black/white evaluation materials; (3) black/white presentation with color evaluation materials; and (4) black/white presentation with black/white evaluation materials.

Materials consisted of self-paced learning booklet containing complementary simple line drawings, word labels, and prose text on the human heart. The self-paced test materials consisted of items measuring four different tasks of cognitive knowledge. Learning and test material content were identical except that in some treatment conditions a six-color code having discriminating physical form and meaningful associative value was applied to the relevant (central) verbal and visual concepts. The color code was applied only to relevant (central) concepts and was present only for the intended learning or test task at hand.

Subjects, assigned to their respective treatment conditions, received one set of instructional materials to work through, then received the evaluation materials consisting of the criterion tests. Six weeks later subjects were asked to complete the same evaluation materials.

A four-factor analysis of variance was used to test the four hypotheses. Alpha was set at .05 for all study comparisons.

Results

Major findings indicated that color coded self-paced presentation materials were superior to the black/white presentation materials at both retention points (immediate and six-week delayed) and on all task tests (drawing, terminology, identification, and comprehension). The presence or absence of color in evaluation materials had no significant effect on student achievement.

Discussion

The effectiveness of the color coded instructional materials may reside in their ability to demand sustained student attention and interaction with the content along with their ability to be able to provide an enhanced associative memory structure. It was also found that the color coding had a more positive impact on tests representing visual tasks (drawing, identification) rather than the more verbal tasks (terminology, comprehension). Also noted was the drop in recall from immediate to delayed retention testing, which though statistically different, evidenced a similar percentage decline for both color coding and black/white instructional groups.

LITERATURE FOR FURTHER INVESTIGATION

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